Bulletin des Chercheurs de la Wallonie, hors-série n° 4 2011 : 197-212 ERAUL 128

The Early Middle Palaeolithic of Belgium

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1. Introduction

Since the publication of Marguerite Ulrix-Closset's (Ulrix-Closset, 1975) volume on the Middle Palaeolithic of the Meuse basin, increased precision in dating techniques, refinements in chronostratigraphy alongside the discovery and investigation of new Middle Palaeolithic sites, have provided increased time depth for the Middle Palaeolithic in the Old World. As a consequence, the onset of the Middle Palaeolithic has been pushed back to around 300/250.000 B.P. (Ronen, 1982; Gamble & Roebroeks, 1999; Moncel, 1999; Conard & Fischer, 2000; McBrearty & Brooks, 2000; McBrearty & Tryon, 2006; White *et al.*, 2006). The early Middle Palaeolithic encompassing M.I.S. 8 to M.I.S. 6 (e.g. Conard & Fischer, 2000; Scott, 2006) is characterised by the widespread occurrence of Levallois technology, when compared to the preceding Lower Palaeolithic. Although limited in number, the Belgian early Middle Palaeolithic data provide information on the nature and timing of the earliest human occupation in this part of Europe, located at the northern limit of the hominin expansion range. These sites contribute to the study of diachronic changes in lithic technology, offering insights into reduction strategies and their spatial organisation.

2. Overview of the Belgian early Middle Palaeolithic data

Palaeolithic artefacts have been found in a number of different geologic and geomorphologic contexts (Ulrix-Closset, 1975; Otte, 1983; Cahen, 1984; Van Peer, 2001; De Bie *et al.*, 2008; Di Modica, 2010). Within the northern part of Belgium, Middle Palaeolithic open air sites have been discovered near the edges of the Flemish valley and its tributaries. Due to poor conservation, most of the assemblages found in the western part of this valley near its edges are not precisely dated (Crombé & Van Der Haegen, 1994). Better conditions for *in situ* preservation can be expected for the base of the valley where Eemian humic deposits are often present (Tavernier & De Moor, 1974). Several Middle Palaeolithic finds from the eastern extension of the Flemish Valley, in particular from the transitional zone between the valley and the sand-loess and lœss areas of Central Belgium (Van Peer, 1986, 1989), also indicate the potential of this region for the discovery of well-preserved sites. Given that the Flemish valley reached a maximal incision during the Middle Pleistocene and was filled up during the Upper Pleistocene, most of these sites are considered to date to the late Middle Palaeolithic.

Cave sites in the valleys of the Sambre, the Meuse and their tributaries have been investigated since the XIXth century and have yielded rich Middle Palaeolithic assemblages, some also containing fossil Neandertal remains (Toussaint *et al.*, 2001; Semal *et al.*, 2005; Toussaint & Pirson, 2006). Again, most sites are Weichselian in age. Evidence predating the Last Interglacial is scarce and poorly dated.

Thick loess coverings in the east and southwest of Central Belgium also produce favorable conditions for *in situ* preservation of Middle Palaeolithic sites. Locally, loess deposits predating the Last Interglacial yielding (early) Middle Palaeolithic artefacts have been preserved. This is for example the case in the Meuse basin in the south-eastern part of the province of Limburg and more upstream near Liège.

Additionally, in the Haine basin near Mons important collections of lithic material have been found associated with ancient terrace deposits dating between M.I.S. 12 and M.I.S. 6, as well as within the loessic and sandy deposits overlying these terrace gravels.

Until now, only the latter two settings, the central Belgian loess region and the fluviatile sequence and overlying deposits in the Haine basin, have yielded early Middle Palaeolithic finds dating between M.I.S. 8 and M.I.S. 6 (fig. 1). These sites and their contribution to our knowledge of the early Middle Palaeolithic within Northwest Europe will be discussed below.

2.1. The Haine basin

The Haine basin testifies of a long research tradition, going back to the second half of the XIXth century (Briart *et al.*, 1868; Delvaux, 1885-1886, 1887-1888; Mourlon, 1889; de Munck, 1889-1890; Rutot, 1892, 1898-1899, 1903; Breuil & Kozlowski, 1934; Breuil & Doize, 1936; Otte & Michel, 1984). Renewed interest in the stratigraphy and Palaeolithic occupation of the area during the second half of the XXth century led to the study of a number of (Lower and) early Middle Palaeolithic sites found in association with a series of fluviatile deposits (fig. 2). These investigations resulted in the recognition of four different terrace levels above

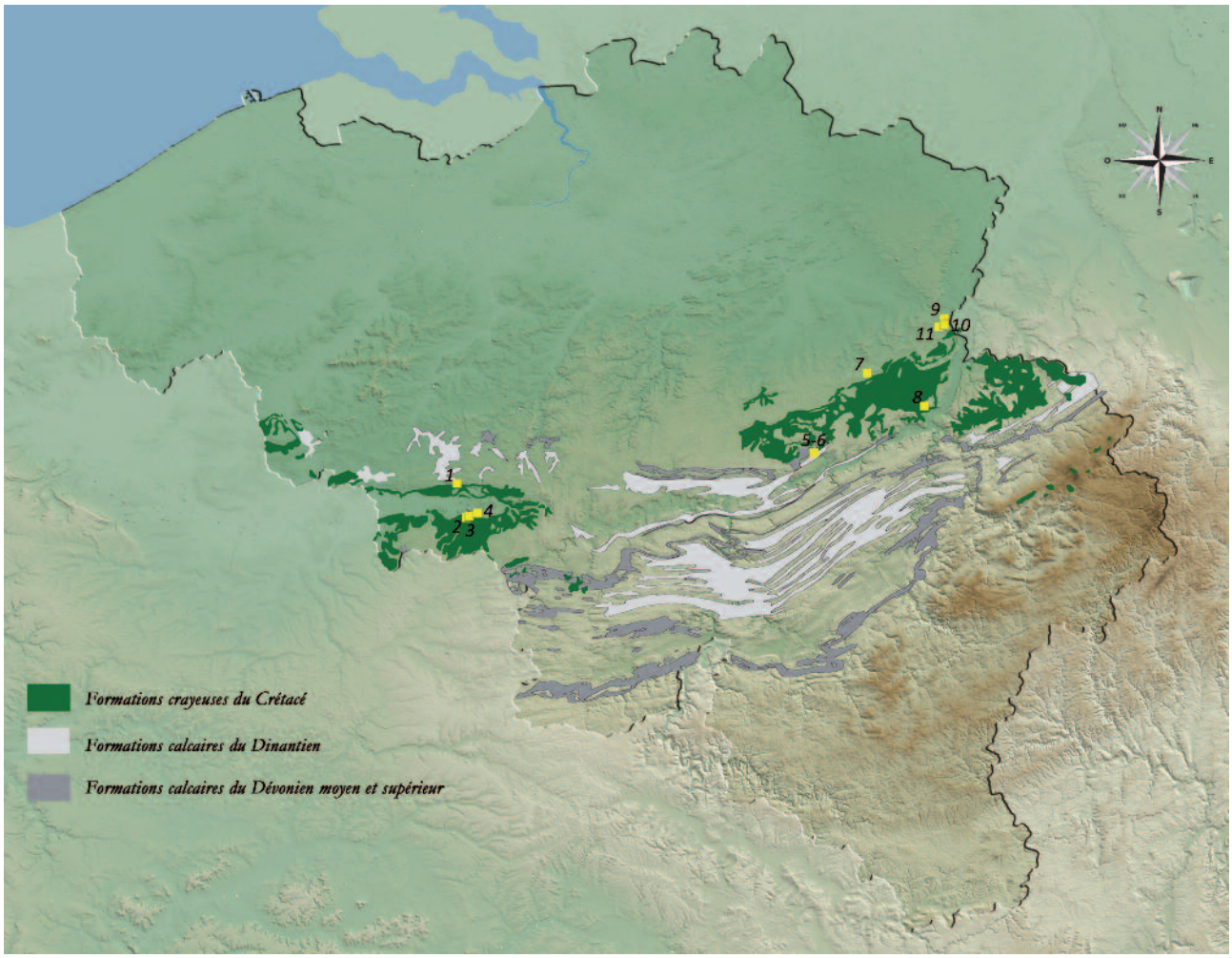

Fig. 1
Location of the early Middle Palaeolithic Belgian sites.

the present thalweg (Haesaerts, 1978). Based on altimetry, biostratigraphy, absolute dating results obtained for the site of *Mesvin IV* and pedostratigraphic observations of the loess sequences overlying these fluviatile deposits, these terraces have been correlated with marine isotopic stages as follows (Haesaerts, 1978, 1981; Cahen & Haesaerts, 1983[a]; Cahen *et al.*, 1983; Cahen *et al.*, 1984; Cahen *et al.*, 1985; Cahen & Michel, 1986; Pirson *et al.*, 2009): the two oldest terrace levels, *Pa d'la l'iau* (+77m) and *Petit-Spiennes* (+68m), have been correlated with M.I.S. 12 and M.I.S. 10 respectively whereas the formation of the younger Mesvin (+60m) terrace is placed within M.I.S. 8. Finally, the formation of the lower gravel unit of *Carrière Hélin* (+47m) is considered to correspond to M.I.S. 6. AAR dating results, however, suggest an older age for this lowest terrace level (Cubuk, 1975), but this date is rejected due to imprecision of the dating technique and the possible reworked character of the dated bone sample (Haesaerts, 1978; Pirson *et al.*, 2009).

Although the oldest two terrace levels predate what is generally considered as the onset of the Middle Palaeolithic (i.e. M.I.S. 8), they are also discussed here to provide a complete overview of the terrace sequence. The fluviatile gravel terrace of *Pa d'la l'iau* is the oldest one and has yielded a rather small collection of artefacts containing a limited number of tools (Cahen *et al.*, 1983; Cahen, 1984). Artefacts have been found in different stratigraphic positions as well as on the present surface. The presence of artefacts in fresh as well as abraded conditions, points to a mixture of different industries. The discovery of some handaxes at the present surface suggests an attribution of at least part of the assemblage to the Acheulean.

The younger terrace deposits of *Petit-Spiennes* (fig. 1.2) are covered by grey loamy sands underlying a loamy deposit. Again, some lithic artefacts were collected at the surface, located near outcrops of the gravel deposits, but many were also found in stratigraphic position, dispersed throughout the fluviatile deposits (Cahen & Haesaerts, 1983[b]; Cahen *et al.*, 1983; Cahen, 1984; Cahen *et al.*, 1985). The assemblage, which clearly results from several occupation phases, contains a large and diverse collection of Acheulean handaxes, carefully made using soft hammer technique. Unprepared core technology dominates the assemblage. Both unifacial and migrating platform cores are present. Many flakes show

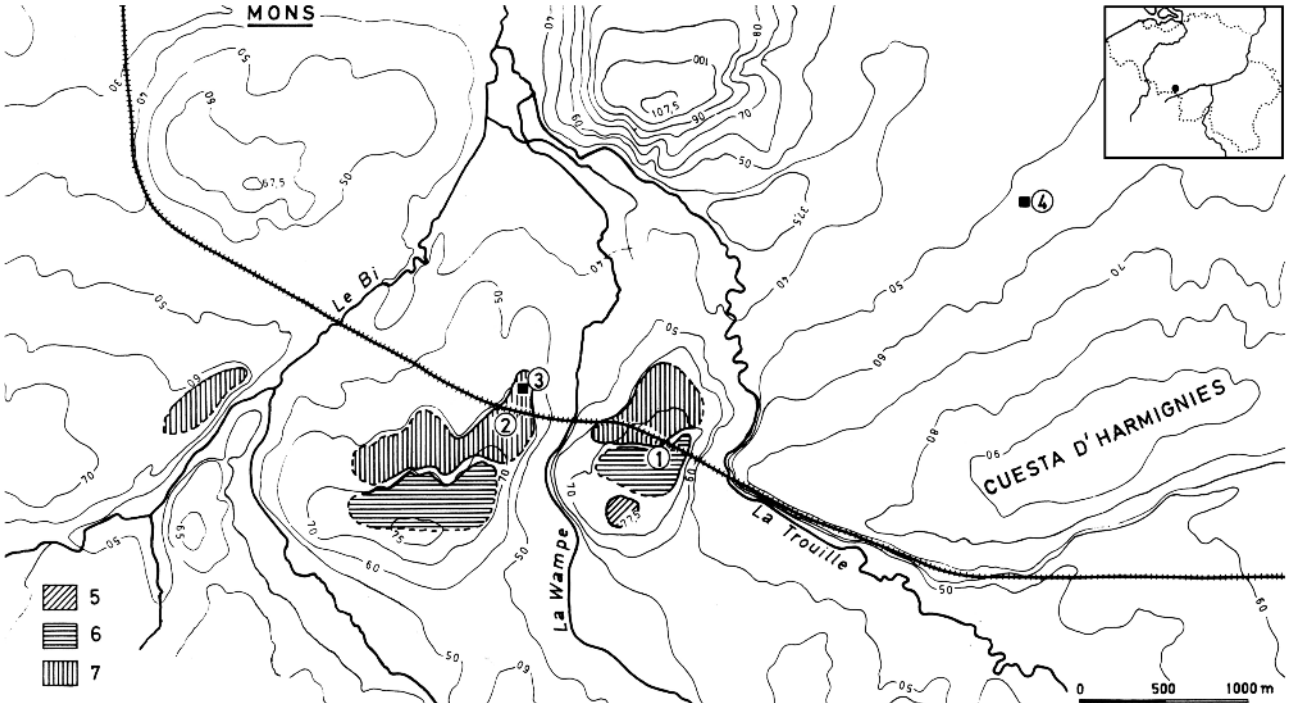

Fig. 2
Location of the sites in the Haine basin: 1. Railway trench of *Petit-Spiennes* 2. Railway trench of Mesvin 3. *Mesvin IV* 4. *Carrière Hélin* 5. *Pa d'la l'iau* terrace 6. *Petit-Spiennes* terrace 7. Mesvin terrace (Cahen *et al.*, 1984: figure 1).

an important percentage of cortex and dorsal negatives are limited, observations which possibly point to a rather low importance of preparation. Nevertheless, some clear examples of prepared core technology such as Levallois cores and flakes, sometimes with facetted platforms, alongside Discoidal cores can be observed. Their presence seems to indicate that these reduction strategies were already fully developed. The differential preservation condition of the artefacts suggests that at least part of the assemblage might consist of reworked material from the older *Pa d'la l'iau* terrace (Cahen & Haesaerts, 1984; Watteyne, 1985).

The terrace of *Petit-Spiennes* is followed by the Mesvin terrace, which consists of alluvial deposits surmounted by a loess cover containing a truncated palaeosol comparable to that of Harmignies (Pirson *et al.*, 2009). Most artefacts are abraded, but some fresh pieces are present as well. Bifaces are rare whereas Levallois flakes and cores occur frequently. The assemblage is heterogeneous, probably partly composed of reworked material from older levels (Cahen, 1984). Lithic material was found in stratigraphic position at the site of *Mesvin IV*, located on the edge of the Mesvin terrace (fig 1.3; Cahen *et al.*, 1984; Cahen & Michel, 1986; fig. 3). At this location, two wide, keel-shaped channels that crosscut each other are incised into the underlying Thanetian sands. One channel cuts into the other channel. At their base a layer of frost-fractured flint nodules underlies a gravel of chalky granules and small flint fragments. Most of the artefacts and bones come from the contact between this basal gravel unit and the underlying Thanetian sands. It is possible that human occupation took place at the bank of the channel after which the archaeological material was washed into the channel. Alternatively, the occupation could have taken place in the bedding of the channel during a dry period after which the material was washed away later. No difference is observed in the typo-technological composition of the material from the two channels. However, the amount of broken and rolled material in the second channel appears to be considerably larger, compared to the first channel. Conversely, the density of the finds within the second channel is considerably lower. Combined with the presence of refitting lithic artefacts and bone fragments between the two channels, these observations suggest that the material found in the second channel probably originated from the first channel. Also, the presence of several blocks of fine grained sediments which preserved their original texture could indicate that these probably eroded from the channel banks in a frozen state and were quickly incorporated into gravels. Based on Uranium-Thorium dating of bone and teeth samples, the deposition of these gravels is placed between 300.000 B.P. and 250.000 B.P. (Cahen *et al.*, 1984; Cahen & Michel, 1986). This is in line with the faunal assemblage which points to a predominantly open and rather cold environment, with some elements indicative of a rather mild and wooded setting. Probably the area was only forested along the rivers. In general, the fauna from the site of *Mesvin IV* is in accordance with an attribution of the site to the earlier part of the Saalian complex (Van Neer, 1985; Van Neer, 1986; Van Asperen, 2008). Palynological evidence indicates

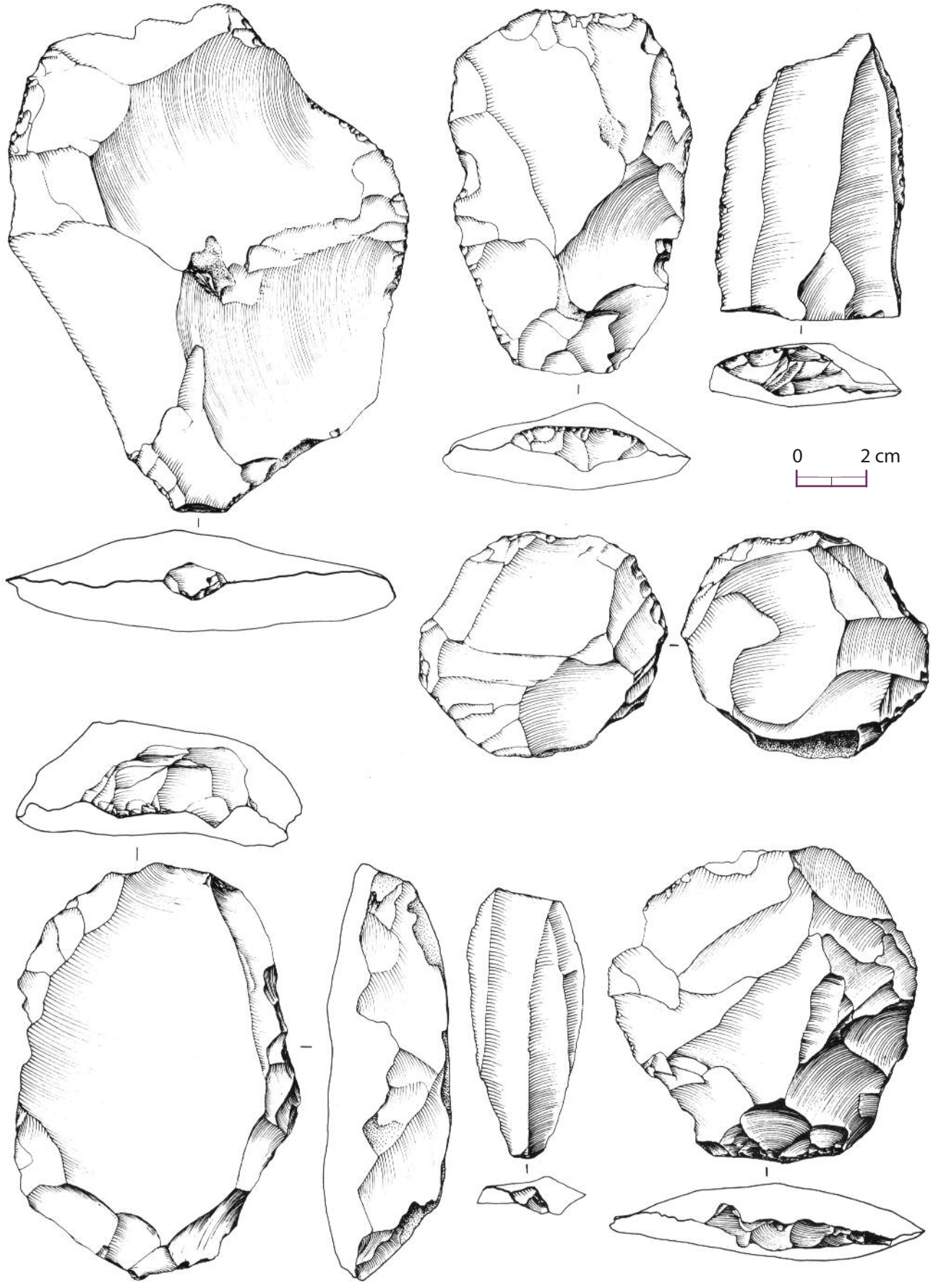

Fig. 3
Lithic material from *Mesvin IV* (Cahen, 1984: figure 49).

a steppe-like environment dominated by grasses, with the presence of some birch and alder (Roche, 1981). The lithic assemblage from the site shows a wide variety of lithic reduction strategies. More opportunistic as well as prepared core strategies are represented. An important percentage of the artefacts is associated with migrating platform technology or simple unifacial flaking strategies. Nonetheless, the importance of the prepared core technology, in the form of both simple prepared core technology and more elaborated Levallois reduction strategies, increases compared to the assemblages from the older terraces. Additionally, unifacial as well as bifacial Discoid technology can be found. A higher emphasis on preparation is not only evidenced by the presence of these prepared cores and their endproducts, it is also illustrated by the presence of prepared platforms and an increase in dorsal scar patterning. These large, well prepared blanks seem to be preferred for the production of flaked tools. Some of the cores, the rejuvenation and end products indicate that blade technology is present to a very limited extent: several cores have been described as double platform cores and produced elongated flakes from two opposite striking platforms. Scrapers and denticulated or notched tools are well represented (Ryssaert, 2004; Ryssaert, 2005; Ryssaert, 2006[a, b]). A variety of handaxes and bifacial tools indicates that this technology is still of some importance. Interestingly some of these bifaces show affinities with 'Micoquian' exemples (Cahen & Michel, 1986; Soriano, 2001). Besides the site of *Mesvin IV*, the basal gravel from the site of *Petit-Spiennes III* is also correlated with the Mesvin terrace and is considered to represent reworked terrace deposits from the latter terrace located higher up the slope (Cahen & Haesaerts, 1982). The composition of the lithic assemblage, found at the surface as well as in stratigraphic position, is very similar to that of *Mesvin IV* (Cahen & Haesaerts, 1982).

The lowest terrace of the system, correlated with M.I.S. 6, is represented by the lower gravel unit in the stratigraphic sequence of Saint-Symphorien–*Carrière Hélin* (fig 1.4). These gravels are covered by thick sandy and loessic deposits containing a series of palaeosoils dating back to the Last Interglacial and early Weichselian. Several find horizons are present. The lower gravel unit (*cailloutis inférieur/cailloutis C*), which is attributed to the late Saalian (M.I.S. 6), is the most important (de Heinzelin, 1959; Cubuk, 1975; Michel, 1978; Cahen, 1984; Escutenaire, 1996).

Another early Middle Palaeolithic site, located in the northern part of the Mons basin, is the site of *Le Rissori* (fig. 1.1). It does not belong to the fluviatile terrace sequence described above. Here, four lithostratigraphic units are differentiated on top of a basal gravel unit, considered to be equivalent in age to the Mesvin terrace. These four units consist of sandy and sandy-loamy deposits each containing a gravel unit, and are separated from each other by three palaeosoils attributed to late M.I.S. 8/M.I.S. 7c, M.I.S. 7a and M.I.S. 5, respectively (Adam, 2002). Three early Middle Palaeolithic assemblages (IV, IIIB and IIIA) are found in association with the gravel units present in the lowest three lithostratigraphic units. Consequently, the lower assemblage (IV) is considered to be contemporary to the *Mesvin IV* assemblage, whereas the assemblage IIIA is thought to be contemporaneous to or immediately postdate M.I.S. 7a (Adam & Tuffreau, 1973; Locht, 1986; Adam, 1991, 2002). It remains unclear whether the assemblages from *Le Rissori* are in reworked position or not.

These Saalian assemblages from *Carrière Hélin* and *Le Rissori* show several affinities with the *Mesvin IV* assemblage. Bifacial technology is absent or very rare, whereas Levallois cores *sensu stricto* are well represented besides a small number of Discoid cores. Some examples of more opportunistic core technology are present as well. At *Le Rissori*, prepared double platform cores are well represented. Both the blank negatives on the cores, as well as the presence of an important percentage of blades, indicate that this assemblage was largely oriented towards the production of blades. Blades are also produced during elaborated single platform Levallois sequences. This is in particular the case in the younger assemblages at *Le Rissori* (Révillion, 1993).

2.2. The Meuse Basin

In the south-eastern part of the province of Limburg, several Middle Palaeolithic sites have been discovered during the last decades in the course of loess extraction activities taking place in brickyard quarries (fig. 4). This area, located between Vroenhoven and Veldwezelt, is characterised by the presence of a fossil meander bend of the Meuse which curves around the area of the present *Dousberg*, cutting into the underlying *Pietersberg* or main terrace (Meijs, 2002, s.d.). Within this meander bend two ancient terrace levels (Rothem 1 and 2) have been preserved. When the meander was subsequently abandoned by the Meuse, this incision acted as a sediment trap, preserving a sequence of Weichselian and pre-Weichselian loess deposits. Three different sites, located within these loess deposits, have yielded Middle Palaeolithic artefacts predating the Last Interglacial.

At Kesselt–*Nelissen* (fig. 1.11; Groenendijk *et al.*, 2001; Meijs, s.d.), located on the western side of the Albert Canal, small numbers of artefacts have been found scattered over six levels, two of which (levels A1 and A2) predate the Last Interglacial. Archaeological level A1 consists of only four artefacts found within the Hees luvisol (M.I.S. 7 . after Meijs, 2002). This period of soil formation is followed by a severe phase of wind and water erosion, resulting in the formation of a polar desert pavement (Hazendans discordance; early M.I.S. 6; Meijs, 2002). In association with this polar desert pavement, 27 strongly weathered artefacts

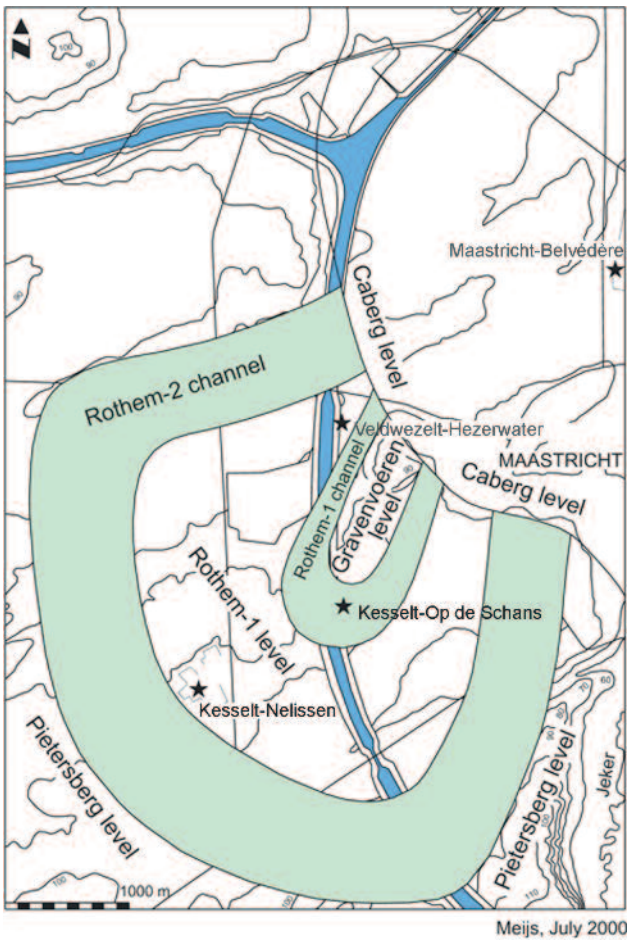

Fig. 4
Location of the sites in the Meuse basin (southeast Limburg) (after Meijs, 2002: figure 1).

(archaeological level A2) have been found. Given their stratigraphic position and their condition, they are clearly reworked.

Two other sites yielding early Middle Palaeolithic artefacts, Veldwezelt–*Hezerwater* and Kesselt–*Op de Schans*, are located on the eastern side of the Albert Canal, on the small stretch of land between the canal and the border with the Netherlands. At the brickyard quarry of Veldwezelt–*Hezerwater* (fig. 1.9) several archaeological levels dating from the Late Saalian to the Weichselian have been found on the western bank of the Hezerwater (Bringmans *et al.*, 2003; Bringmans, 2006[b], 2007). The Late Saalian finds consist of small numbers of artefacts found in association with gravel deposits present at the base of the incision made by the Hezerwater into the underlying Meuse terrace as well as within the loamy deposits which locally overly these gravels. Among these artefacts, a limited amount of Levallois products is present. Most of the artefacts, however, are probably in secondary position. In addition, somewhat higher in the stratigraphic sequence, two incipient soils developed on the valley slopes have yielded two larger lithic assemblages (VLL and VLB). The lowermost of these two assemblages (VLL) contains around 800 rather fresh looking artefacts, encompassing parallel/prismatic cores with one or two opposed platforms alongside opportunistic cores with single, opposed or multiple platforms. No evidence for centripetally organised reduction strategies, such as Levallois or Discoid strategies, is present. The uppermost of the two assemblages (VLB) is slightly smaller, but also consists of rather fresh looking artefacts. Contrary to the VLL assemblage, evidence of Levallois debitage is present, in addition to parallel and opportunistic strategies. The impact of post-depositional alterations is considered limited for both assemblages, although it is uncertain whether they each represent one or more phases of human occupation. They are interpreted as knapping workshops following the extraction of locally available flint nodules. Both soils containing the lithic assemblages were found beneath what was identified as the Rocourt Pedocomplex (Bringmans *et al.*, 2001; Bringmans, 2006[a]). Therefore, their formation has been correlated with a climatic oscillation taking place near the end of M.I.S. 6, probably the Zeifen Interstadial (M.I.S. 6.01, Bringmans, 2007). Recently, however, an alternative interpretation of the stratigraphic sequence has been proposed (Meijs, in press), assigning the units containing the vll and vlb assemblages to M.I.S. 5d.

About 1,6 km south of Veldwezelt–*Hezerwater*, recent excavations at the brickyard quarry of Kesselt–*Op de Schans* (fig. 1.10) revealed the presence of a palaeolevel containing four isolated knapping floors (ODS 1-4) located 10 m below the present surface. Based on stratigraphic arguments, this level is dated to the transition M.I.S. 9/M.I.S. 8 (fig. 5; Van Baelen *et al.*, 2007; Van Baelen *et al.*, 2008; 2011 this volume). The palaeosurface on which the artefacts were discarded is identified as the stratigraphic interface between a sandy, weakly humic level containing small gravels and charcoal particles which was redeposited on top of an erosion level, and an overlying sandy loess deposit characterised by syngenetic humus formation in its lower part. Underlying both stratigraphic levels is a truncated luvisol (Montenaken luvisol) with a white greyish sandy deposit of variable thickness on top. This luvisol, correlated with M.I.S. 9 (Meijs, 2002), acts as a *terminus post quem* for the human occupation. The accumulation of the sandy loess taking place quickly after the deposition of the lithic material is correlated with the deteriorating climate at the beginning of M.I.S. 8. Despite a varying vertical dispersion of the artefacts into the underlying stratigraphic levels, their mint condition, the high percentage of small fragments and chips alongside the restricted horizontal layout of the artefact concentrations and the conjoining evidence suggest that no major taphonomic disturbances have taken place. Each concentration counts between 100 and 1.037 artefacts and has a maximal diameter of circa 5 m whereas the distance between these concentrations varies between 20 m and 90 m. A palaeotopographic

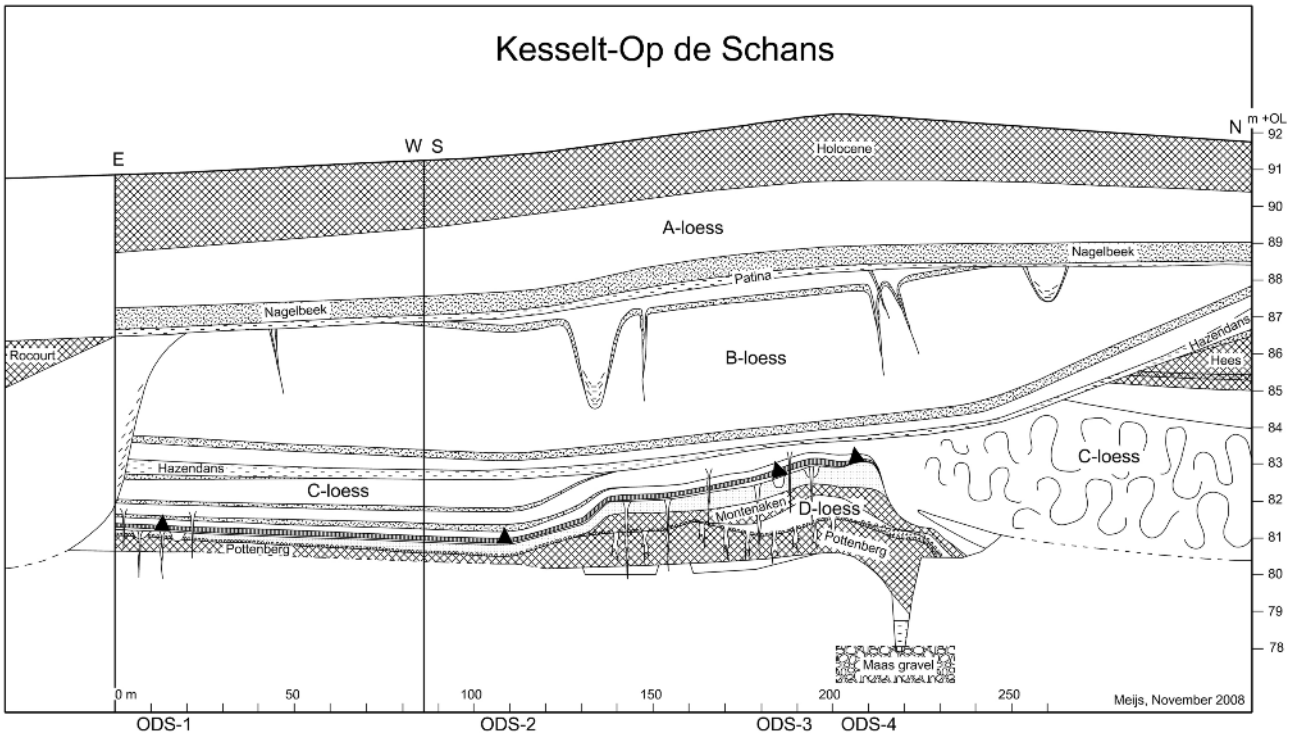

Fig. 5
Stratigraphic position of the palaeolevel at Kesselt–*Op de Schans*. Black triangles indicate the position of the lithic scatters (Meijs, 2008).

reconstruction based on auguring data and different sections shows the presence of a sloping surface with the two most northern concentrations (ODS 3-4) found near the top of the slope, while ODS 1 and 2 are located more in the depression. The lithic concentrations represent four knapping floors where a limited amount of flint nodules, probably of local origin, were reduced. Partial as well as nearly complete refitted reduction sequences are attested. In addition to several shorter conjoined sets, five long refitted reduction sequences are present. From a technological point of view, Discoid and Levallois alongside simple prepared core strategies are represented. Remarkable is the careful preparation of striking platforms associated with Discoid debitage. No indications for *façonnage* are present. In addition to the flint knapping taking place on site, a limited number of finished products (e.g. scrapers and Levallois flakes) seem to have been brought to the site as well.

In the northern part of the Kesselt–*Op de Schans* quarry, a scraper fragment has been found in a stratigraphic position similar to the four artefacts of archaeological level A1 from Kesselt–*Nelissen* (E. Meijs, personal communication). Like these artefacts, the scraper fragment seems to be associated with the Hees luvisol (M.I.S. 7).

In addition to these finds, evidence of early Middle Palaeolithic occupation has also been recorded at Liège–*Sainte-Walburge* (fig 1.8). Investigations held in this sand pit during the early XXth century revealed the presence of Middle Palaeolithic artefacts in different stratigraphic positions (Lohest & Fraipont, 1911-1912; De Puydt *et al.*, 1912; De Puydt, 1922). The most important archaeological level (*Niveau inférieur*) consisted of artefacts found within a gravel layer, which occurred underneath a luvisol. Additionally, gravel lenses within and a gravel layer above this luvisol yielded lithic artefacts as well (*Niveau supérieur* or *Niveau Commont*). The typological composition of the assemblages from the different levels is similar: they all contained bifaces alongside Levallois products. These characteristics led to the interpretation that the artefacts were originally part of one assemblage which subsequently became (partly?) reworked (Ulrix-Closset, 1975). Based on typological criteria, the main archaeological horizon (*Niveau inférieur*) has been classified as *Vieux Moustérien* (De Puydt *et al.*, 1912), *Moustérien ancien de tradition acheuléenne et de débitage levallois* (Ulrix-Closset, 1975: 121-128) and *Jung-Acheuléen* (Bosinski, 1978). Based on geomorphologic elements, Roebroeks (1981) suggested that the luvisol above the main archaeological horizon might be correlated with the Rocourt Pedocomplex (M.I.S. 5). If correct, this interpretation would imply an attribution of the main archaeological horizon to the penultimate glaciation.

Contrary to the aforementioned open air sites, some cave sites in the Mehaigne basin, a tributary of the Meuse upstream of Liège, can possibly be added to the list of sites containing M.I.S. 6 artefacts (Van Peer, 2001). Both Moha–*grotte de l'Hermitage* (fig. 1.5) and Huccorgne–*Abri Sandron* (fig. 1.6) have, however, been excavated at the end of the XIXth century (de Loë, 1883;

Fraipont & Tihon, 1896). Therefore, as little is known about the number of archaeological levels present and the precise stratigraphic position of the finds, it cannot be excluded that the assemblages reflect repeated occupation phases. The co-occurrence of Levallois products and bifaces resulted in the classification as *Acheuléen récent de débitage Levallois* and *Acheuléen récent/Moustérien ancien de tradition acheuléenne* of the assemblages from *grotte de L'Hemitage* and *Abri Sandron*, respectively (Ulrix-Closset, 1975). More recently the former assemblage has been classified as early Middle Palaeolithic based on techno-typological characteristics (Sitlivy, 1996). Conversely, the macrofauna from both sites has been correlated with Saint Germain I (M.I.S. 5c; Cordy, 1984), suggesting a younger date for the deposits, but the exact association between the fauna and the lithic material remains uncertain.

Also for the site of Otrange (fig. 1.7), situated on the upper part of a slope oriented towards the alluvial plain of the Jeker, an attribution to the penultimate glaciation cannot be excluded (Thisse-Derouette & Destexhe-Jamotte, 1947, 1949; de Heinzelin de Braucourt, 1950; Ulrix-Closset, 1975; Jungels, 2005; Di Modica & Jungels, 2009).

3. Discussion

3.1. Typo-technological composition of the assemblages

The number of Belgian sites dating to the early Middle Palaeolithic is limited, especially when only the number of securely dated *in situ* assemblages is considered. In general, the available evidence comes from various sedimentary settings and is characterised by important differences in resolution. These range from reworked material found within coarse grained terrace deposits to *in situ* artefact scatters reflecting short term events and quickly covered by aeolian sediments. As a consequence, these different datasets provide very different sorts of information regarding the earliest part of the Middle Palaeolithic (see also Roebroeks & Tuffreau, 1999). The evidence available from the Haine basin provides important information offering a long term perspective on changes in lithic technology in the time span between M.I.S. 12 and M.I.S. 6. The data from these terraces must be considered as palimpsests and lump artefacts together resulting from different moments in time and different activities, forming time and space averaged assemblages. Although they do not provide detailed information regarding the precise moment of human occupation, the nature of this occupation nor the spatial organisation of the lithic *chaîne opératoire*, to a certain extent they do provide information on general diachronic changes present in lithic technology. In this respect, the evidence from the terraces of the Haine basin is comparable to that of other river systems (e.g. Ashton & Lewis, 2002; Antoine *et al.*, 2003; Hosfield, 2005; Ashton & Hosfield, 2010; Scott *et al.*, 2010) and complements the data from undisturbed sites. The general pattern resulting from the fluvial archive of the Haine basin is one of gradual changes in lithic technology: from the oldest *Pa d'la l'iau* terrace to the youngest terrace deposits observed at *Carrière Hélin*, a general decrease in handaxes is observed, whereas the proportion of Levallois products seems to increase. First observed during M.I.S. 10 at the *Petit-Spiennes* terrace, the number of Levallois products slowly increases in *Mesvin IV* and *Petit-Spiennes III* as well as in the lower gravel unit at *Carrière Hélin* and at *Le Rissori*. Although the assemblage at *Petit-Spiennes* is still dominated by unprepared core technology, it is important to note that the Levallois technology observed at the site is already fully developed.

Contrary to the low resolution data from the terrace deposits which provide information on a long term scale, evidence from high resolution contexts is also available. Loess contexts generally represent high resolution stratigraphic settings which allow a good correlation with climatic and isotopic evidence. Sites found within such contexts can often be situated very precisely within these succeeding phases of loess deposition and soil formation (though important erosion phases occur as well), providing relative dates for the human occupation levels. Moreover, because the quick deposition of these aeolian sediments does enable a good preservation of archaeological remains, in some cases sites represent snapshots of prehistoric activities. For instance, the M.I.S. 9/M.I.S. 8 level present at Kesselt–*Op de Schans* provides information on knapping activities, allowing a detailed reconstruction of the lithic *chaînes opératoires*. Similar high resolution evidence is available for the Saalian sites of Maastricht–*Belvédère*, dating to M.I.S. 7 (Roebroeks, 1988; De Loecker, 2005) and located only around 4,5 km northeast of Kesselt–*Op de Schans*.

The techno-typological composition of the assemblages from the *Petit-Spiennes* and Mesvin terraces, as well as from the sites of *Mesvin IV* and *Petit-Spiennes III*, reminds of that of the Epi-Acheulean assemblages from Northern France (Tuffreau, 1979). These early Middle Palaeolithic sites are characterised by the co-occurrence of Levallois products alongside a mostly low percentage of handaxes, which is for example the case at Bapaumes–*Les Osiers* (Tuffreau, 1976; Koehler, 2008). Similar assemblages are also known from *Le Pucheuil* (Delagnes & Ropars, 1996) and *La Cotte* de Saint-Brelade (Callow & Cornford, 1986). A higher percentage of handaxes as well as evidence of handaxe transport is attested at the early Middle Palaeolithic sites of Gentelles (Tuffreau *et al.*, 2001; Tuffreau *et al.*, 2008), Gouzeaucourt (Tuffreau & Bouchet, 1985;

Lamotte, 1992; Lamotte, 2001; Tuffreau *et al.*, 2008) and Ranville (Cliquet, 2008). At these sites, Levallois debitage is absent or only present in insignificant numbers. In general, however, the presence of handaxes seems to become less common in M.I.S. 7 and M.I.S. 6. Additionally, several early Middle Palaeolithic assemblages are known containing Levallois but no handaxes, for example Biache-Saint-Vaast (Tuffreau & Sommé, 1988), Therdonne (Locht *et al.*, 2010) and Maastricht–*Belvédère* (Roebroeks, 1988; De Loecker, 2005). The M.I.S. 9/M.I.S. 8 level of Kesselt–*Op de Schans* can be added to this list. The appearance of blade reduction systems such as at *Le Rissori* is not an isolated case. Similarly, for the assemblages of Saint-Valéry-sur-Somme (Haesaerts & de Heinzelin, 1983) and Tourville-la-Rivière (Guilbaud & Carpentier, 1995) an orientation towards the production of blades and elongated flakes has been noted.

In Great Britain, the situation is slightly different. In the Thames valley (e.g. Ebbsfleet Channel, Baker's Hole, Lion Pit Tramway Cutting, Creffield Road), Levallois and bifacial products are both found, but a secure association between both artefact types has never been observed (Scott *et al.*, 2010). Outside the Thames valley, such an association is present at Pontnewydd Cave (Wales) where an important number of handaxes co-occur with Levallois products (Green, 1984; Aldhouse-Green, 1988). Two other sites, Harnham and Broom, show a different assemblage composition, dominated by bifaces and with no or few Levallois products. At Harnham, bifaces and refitting by-products of biface manufacture have been found within deposits dated to around 250.000 B.P. Molluscs indicate a cold, but not fully glacial environment (Whittaker *et al.*, 2004). Handaxes also dominate the Broom assemblage, whereas Levallois products are extremely rare. The fluviatile deposits containing these artefacts have been dated between 270.000 and 250.000 B.P. (Hosfield & Chambers, 2003).

The presence of patterning in assemblage compositions, and the extent to which these differ from the Lower Palaeolithic, remains difficult to interpret and more data is definitely needed to gain a better understanding of these differences. Regarding the emergence of the Levallois technique, however, some hypotheses have been put forward.

During the Lower Palaeolithic in Northern France, handaxes are generally associated with unprepared core technology (e.g. migrating-platform technology). Early examples of Levallois technology from the La Garenne terrace level (M.I.S. 12) have been described, although older examples have been claimed as well (Tuffreau, 1995). At Cagny–*La Garenne*, some handaxes seem to be reused to produce flakes which are morphologically comparable to preferential Levallois flakes. According to Tuffreau (Tuffreau, 1995), these examples represent a conceptual link between *façonnage* and Levallois debitage, lying at the origin of Levallois technology.

For Northwest-Europe, the emergence of Levallois technology has also been argued to have evolved out of a 'proto'-Levallois stage, referred to as simple prepared core technology. This reduction strategy, described by White and Ashton (2003) based on a set of cores from Purfleet-Botany Pit (dated to late M.I.S. 9 or early M.I.S. 8) and some conjoined artefact sequences from Frindsbury, shows several characteristics similar to the Levallois reduction strategy (Van Peer, 1992; Boëda, 1994), but differs from it by showing limited to no attention for the installation and maintenance of lateral and distal convexities of the upper core surface, alongside a minimal to no preparation of the striking platforms. It is argued that this simple prepared core technology precedes the development of more complex and elaborated forms of prepared core technology occurring later in the Middle Palaeolithic. A refitted sequence from Kesselt–*Op de Schans* (ODS 4, early M.I.S. 8; Van Baelen *et al.*, 2008) shows important similarities with the description put forward by White and Ashton. Also a group of cores from the site of *Mesvin IV* (M.I.S. 8) displays these characteristics, but the preparation of the lower surface seems to be more evolved here (Ryssaert, 2004).

Both hypotheses concerning the origin of Levallois are not mutually exclusive. Indeed, the existence of multiple potential antecedents of Levallois technology within the Old World has been stressed repeatedly (Rolland, 1995; White & Ashton, 2003; White *et al.*, 2010). Within this context, it is interesting to note that the presence of fully developed Levallois technology present in the *Petit-Spiennes* terrace, correlated with M.I.S. 10, precedes the simple prepared core technology described for Purfleet, Frinsbury and Kesselt–*Op de Schans*.

3.2. Patterns of presence and absence of human populations

For the period between 500.000/450.000-200.000 B.P. an occupation pattern in Northern France has been suggested similar to that observed for the late Middle Palaeolithic (Antoine *et al.*, 2003; Antoine *et al.*, 2010). Human occupation is expected during transitional (early or late glacial) or interglacial periods, whereas humans are considered to be absent during pleniglacial phases. In their overview of the early Middle Palaeolithic in Northwest-Europe, Scott and Ashton (2010) reach a similar conclusion. They illustrate that, whereas evidence supports human occupation during late M.I.S. 9/early M.I.S. 8 (e.g. Gentelles CSI-SLG,), humans seem to be absent from Northwest-Europe during the M.I.S. 8 Pleniglacial. The Belgian sites of *Mesvin IV*, Kesselt–*Op de Schans* and possibly also *Le Rissori* IV confirm this

observation. During the later part of M.I.S. 8/early M.I.S. 7, the presence of a number of sites (e.g. Baker's Hole, Salouel, Le Pucheuil A-C) suggests repopulation of the area (Scott *et al.*, 2010).

Few sites on the other hand can be attributed to M.I.S. 7 and are characterised by fully temperate conditions. Notable exceptions here are the sites of Tourville-la-Rivière and Maastricht–*Belvédère*. Similar to the Last Interglacial, the impact of taphonomy (i.e. reduced sedimentation rates) on site preservation need to be taken into account (Roebroeks & Tuffreau, 1999; Roebroeks & Speleers, 2002). Therefore, the small number of artefacts found at Kesselt–*Nelissen* and Kesselt–*Op de Schans* in the M.I.S. 7 Hees luvisol are of particular interest. However, further study is definitely needed to understand their taphonomic history. Based on its stratigraphic position, between two palaeosoils correlated with M.I.S. 7c and 7a respectively, the lithic assemblage IIIB from *Le Rissori* can be added to this list. However, its position within a gravel layer, requests caution. Conversely, uncontested British early Middle Palaeolithic sites of a similar age (i.e. postdating early M.I.S. 7) are lacking. Until now, it remains unclear to what extent different factors such as taphonomy or the specific palaeogeographic setting of Britain contribute to this pattern (Scott *et al.*, 2010).

On the continent, evidence of human presence continues into late M.I.S. 7 and early M.I.S. 6 (e.g. *La Cotte* de Saint Brelade, Biache-Saint-Vaast, Therdonne, *Le Pucheuil* B, Bapaume–*Les Osiers*, *Le Rissori* IIIA; Scott *et al.*, 2010). Additionally, a M.I.S. 6 age has also been suggested for the main archaeological horizon from Liège–*Sainte-Walburge* (*supra*), but because it was investigated early in XXth century and is poorly dated, a more precise correlation with the marine isotopic curve is not possible. Depending on whether their suggested M.I.S. 6 age is correct, the assemblage from the lower gravel unit of *Carrière Hélin* and the VLL and VLB assemblages from Veldwezelt–*Hezerwater* can be added to this list.

4. Conclusion

The Belgian data, although limited in number, contribute to the understanding of the early Middle Palaeolithic. However, it is clear that in order to arrive at a better understanding of assemblage composition and occupation patterning, an increased number of securely dated contexts is needed. In this respect, the investigation of brickyard quarries in the Meuse basin deserves particular attention.

Additionally, it is felt that more information on the various reduction strategies (not only Levallois) present during the early Middle Palaeolithic is needed in order to fully appreciate technological variability. These developments in lithic technology should not be seen in isolation from other changes in the archaeological record.

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